
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: February 2009

Questions regarding this report should be directed to:

Paul Massera

California Department of Water Resources
Division of Environmental Services
3500 Industrial Blvd
West Sacramento, CA 95691

Telephone: (916) 376--9693
pmassera@water.ca.gov

TABLE OF CONTENT

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT	1
2. MONITORING RESULTS.....	2
2.1 CHANNEL WATER SALINITY COMPLIANCE	2
2.2 DELTA OUTFLOW.....	2
2.3 RAINFALL	3
2.4 SUISUN MARSH SALINITY CONTROL GATE (SMSCG) OPERATIONS	3
3. DISCUSSION.....	3
3.1 FACTORS AFFECTING CHANNEL WATER SALINITY IN THE SUISUN MARSH	3
3.2 OBSERVATIONS AND TRENDS.....	4
3.2.1 <i>Conditions during the Reporting Period</i>	4
3.2.2 <i>Comparison of Reporting Period Conditions with Previous Years</i>	4

4. List of Figures

- Figure 1: Suisun Marsh Progressive Mean High Tide Specific Conductance for compliance stations
Figure 2: Suisun Marsh Progressive Mean High Tide Specific Conductance for monitoring stations
Figure 3: Daily Net Delta Outflow Index and Precipitation
Figure 4: 10-yr Comparison of Monthly Values of Monthly Mean Specific Conductance at High Tide for compliance and monitoring stations
Figure 5: Map of compliance and monitoring stations, and control facilities in Suisun Marsh

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of February, 2009, **deficiency standard apply and salinity conditions at only two compliance stations (i.e. S21 and S42)** are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of February was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations S-21 and S-42 was 15.6 mS/cm during February 2009. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\# \text{ days of the month}}$$

2.2 Delta Outflow

Outflow for February 2009 started off below 10,000 cfs and continued to be around that level until mid-February where there was the first sign of good rainfall amount since fall of 2008 as shown in Figure 3. There were several rainfall events in the first half of February, but it was the second half that had several rainfall events which had impressive rainfall totals that brought outflow up to about 40,000 cfs followed by a brief dropped to about 27,000 cfs, and ended the month on a high note above 36,000 cfs. Outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for February 2009 is listed below:

Month	Mean NDOI (cubic feet per second)
February	20,935

2.3 Rainfall

There were many precipitation events throughout February, but the first half of the month totals were not as impressive as the second half of the totals as shown in Figure 3. Most of the daily rainfall events in the first half of February no more than 0.6 inches, whereas all of the second half precipitation events were greater than 0.6 inches, except for the last rainfall event in late February with a total of about 0.2 inches. The largest daily and monthly rainfall occurred on February 23, with an impressive total of about 2.50 inches. Overall, the monthly total rainfall amount was 2.96 inches more than all the monthly totals of October, November, December of 2008, and January 2009 combined. The monthly total is shown below:

Month	Total Rainfall (inches)
February	9.31

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during February 2009 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
February 1 – 4	3 Tidally operate	In	Open
February 5 - 18	3 Open	In	Open
February 19 – 26	3 Tidally operate	In	Open
February 27 – 28	3 Open	In	Open

The gates were operated at the start of February 2009 to control and meet the monthly standards. The gates were suspended in early February due to anticipated rainfall events and the runoffs resulted from the rain reduced salinity levels to be controllable and did not require gates operations until late February. Thereafter, gate operation resumed to control stricter salinity standards set forth in the Drought Response Fund, but for a short week of operation before suspension the last two days of February.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During February 2009 PDM salinity levels at compliance stations Collinsville(C-2), National Steel(S-64), Beldons(S-49), and Volanti(S-42) ranged between 3.0 mS/cm and 11.0 mS/cm as shown in Figure 1. Salinity levels at all stations dropped slightly due to gate operations, except Collinsville, but that is expected as a result of gate operations, Collinsville salinity normally displays an increase. When gate operations ceased on February 5, salinity at all stations began to increase, except for Collinsville, where it decreased as expected. By the 19th of February, gate operations resumed due to salinity concerns and all the compliance marsh stations responded to gate operation with salinity levels indicating a downward pattern as shown in Figure 1 in late February. At control stations, S35 and S97, salinity levels were both above 14.0 mS/cm and dropped moderately only at S97 as a result of some rainfall events which resulted in some creek runoffs in early part of February. Both stations salinity leveled off in mid-February and remained above 13.0 mS/cm, before both stations salinity levels dropped around February 15 and continue the downward pattern to end the month between 5 mS/cm and 6 mS/cm.

Gate operations during this month were not necessary to meet the D-1641 monthly standards, however, due to contractual obligations and Drought Response Fund triggers, DWR had to utilize gate operations to meet them. Overall, salinity standard of 15.6 mS/cm was met for the month and operated to meet contractual obligations since the standards are stricter than the regulatory D-1641 standard.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for February 2009 were compared with means for those months during the previous nine years (Figure 4).

Mean salinity pattern of all compliance and monitoring stations resemble that of the previous 2002 year levels, but at a much greater magnitude as shown in Figure 4. Compared to previous nine years, February 2009 salinity levels overall were ranked first in high Specific Conductance. Unlike past years, the higher salinity for February 2009 is probably a result of extremely dry antecedent hydrologic conditions along with reduced gate operations for fish concerns.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****February 2009**

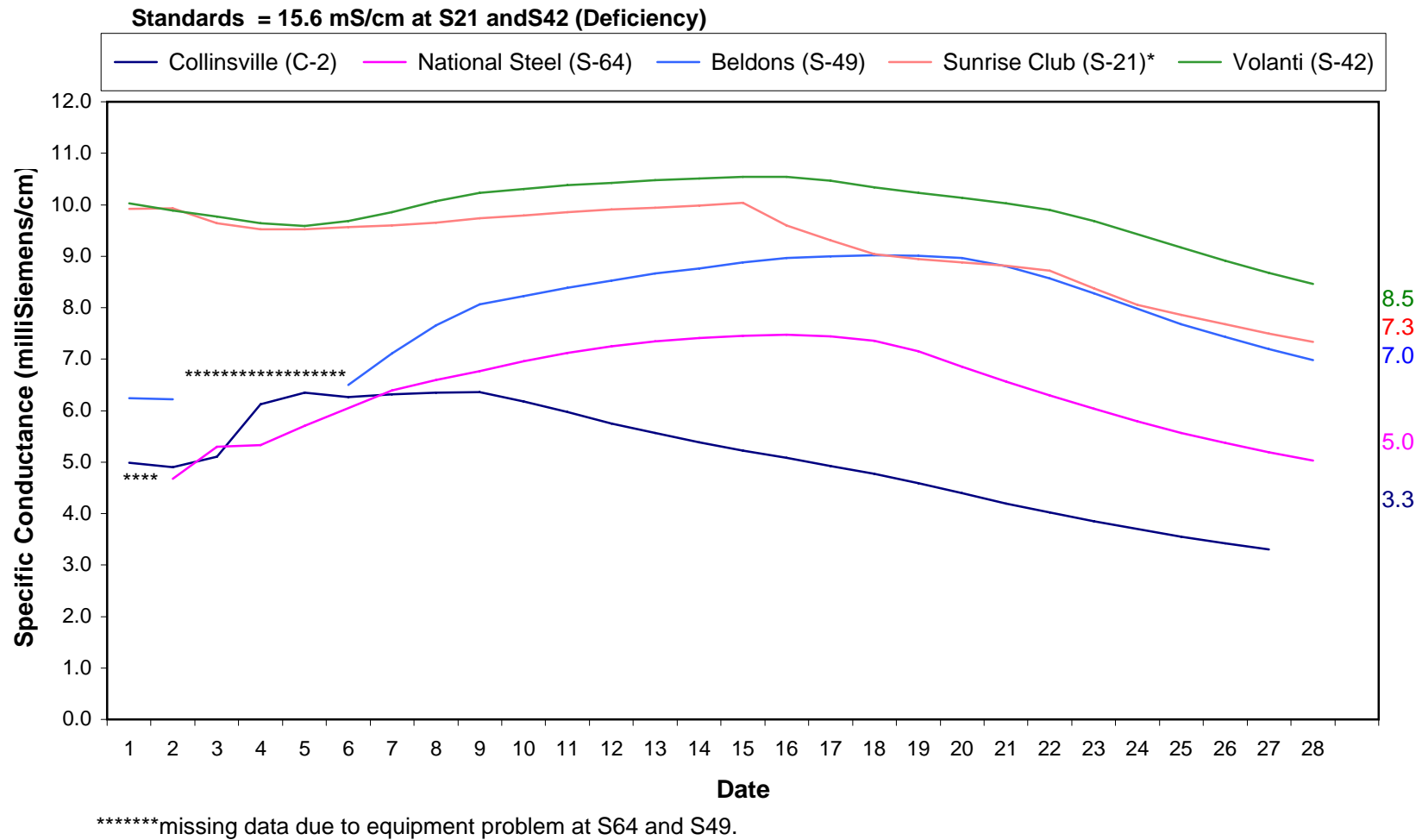
Station	Specific Conductance (mS/cm)*	Deficiency Standard	Deficiency Standard meet?
C-2**	3.3	n/a	n/a
S-64	5.0	n/a	n/a
S-49	7.0	n/a	n/a
S-42***	8.5	15.6	Yes
S-21***	7.3	15.6	Yes

*milliSiemens per centimeter

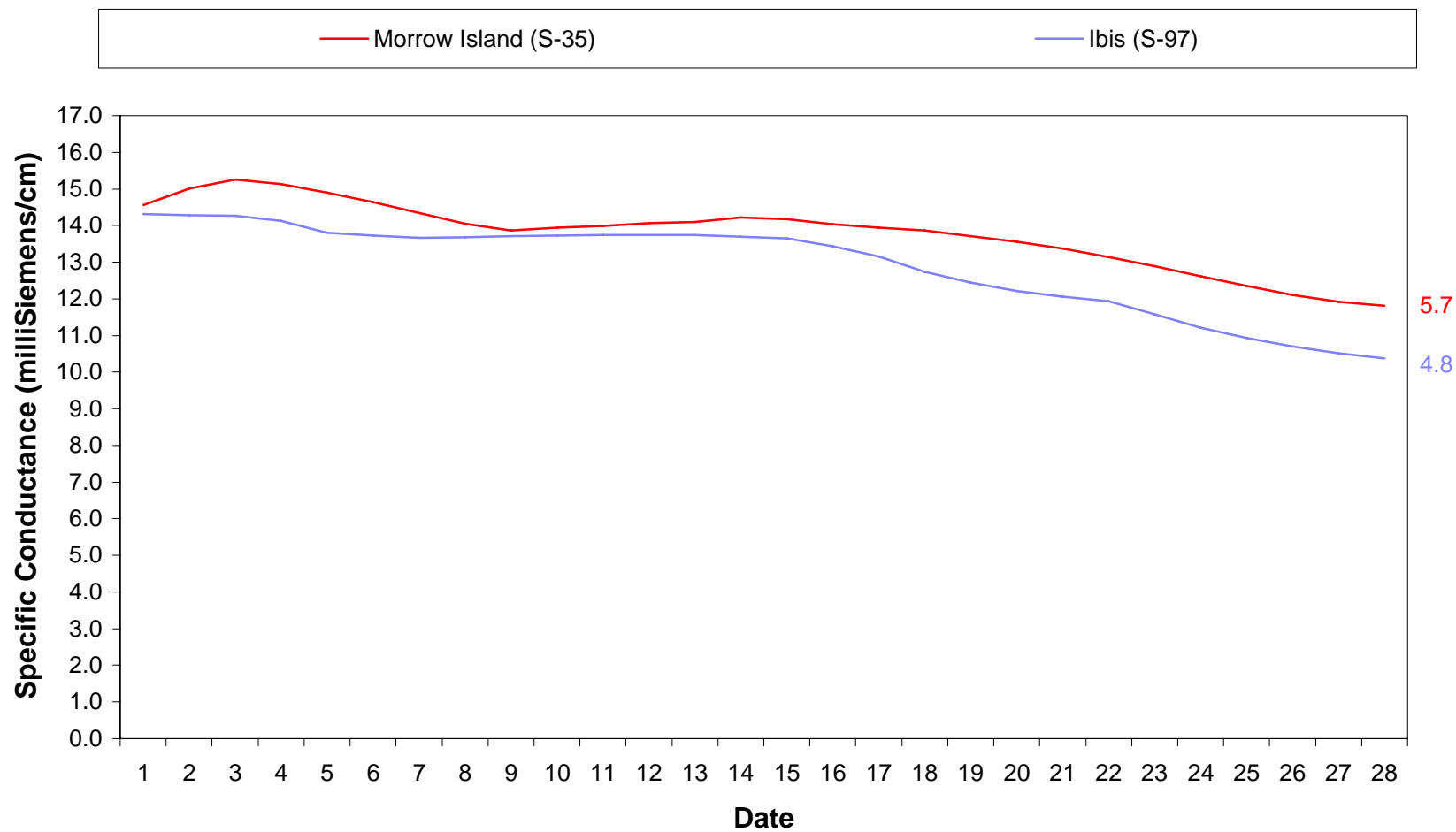
**The representative data from nearby USBR station is used in lieu of data from station C-2.

***As define in D1641 and RSMMPA, monthly standard only apply to compliance stations, S-42 and S-21 during deficiency year.

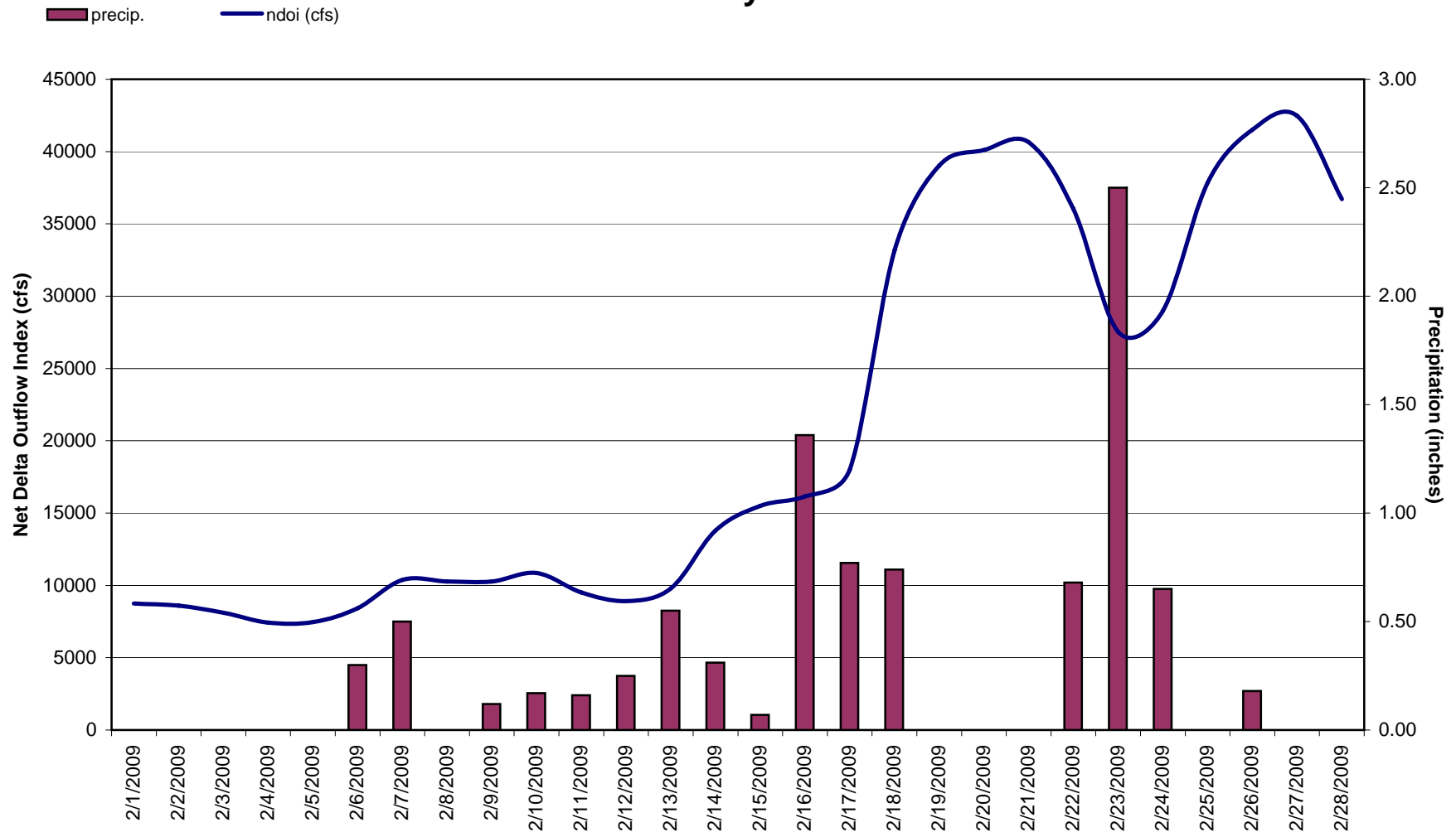
**Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
February 2009**



**Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
February 2009**

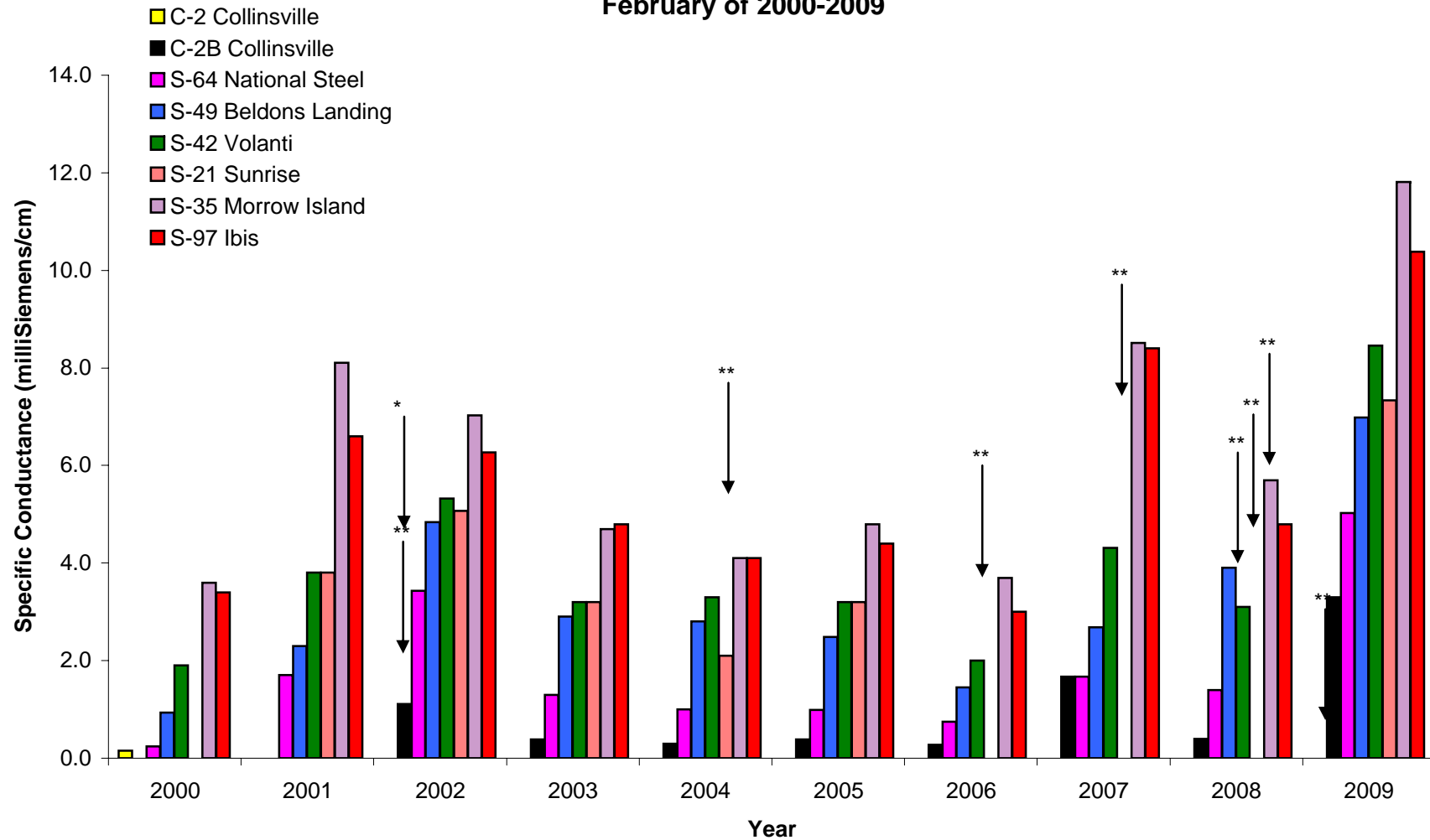


**Figure 3. Daily Net Delta Outflow Index and Precipitation*
February 2009**



*Preliminary DWR, O&M Delta Outflow data and precipitation from Fairfield Water Treatment Plant.

**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
February of 2000-2009**



*Representative data from nearby USBR station is used in lieu of station C-2 from 2002 and thereafter.

**Data missing due to equipment failure or power outage. Number of missing data is small enough not to alter end of month value.

***Data not available due to flooded levees and inaccessible roads.

